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DEPARTMENT OF TRANSPORTATION
NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C. 20591

A70-23

OFFICE OF
THE CHAIRMAN

May 22, 1970

Honorable John H. Shaffer
Administrator
Federal Aviation Administration
Department of Transportation
Washington, D. C. 20590

Dear Mr. Shaffer:

The inadvertent retraction of flaps on certain Cessna single-engine aircraft with electrical flap actuators is strongly suspected as a cause factor in a number of fatal Cessna 150 (Model F or later) aircraft accidents.

Certain flight tests of the Cessna 150 in power-on go-around configuration with full flaps during simulated inadvertent flap retraction resulted in a severe nose-down pitch and altitude loss. Although we are aware of certain maintenance alerts and service bulletin actions pertaining to maintenance of the flap actuators, we recommend that until more complete preventive action can be determined, that all operators of appropriate Cessna single-engine aircraft with electrical flap systems be advised immediately of the potential hazard and appropriate piloting techniques be utilized to assure adequate control of the aircraft with the malfunctioning flap system.

Sincerely yours,

John H. Reed
Chairman

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OFFICE OF
THE CHAIRMAN

June 26, 1970

Honorable John H. Shaffer
Administrator
Federal Aviation Administration
Washington, D. C. 20590

Dear Mr. Shaffer:

We have evaluated your response of June 4, 1970, to our recommendation of May 22, 1970, concerning inadvertent flap retraction hazards strongly suspected as a cause factor in a number of Cessna 150 fatal aircraft accidents.

We appreciate that in your telegraphic alert of May 22, 1970, to your regional offices you have suggested that pertinent information be disseminated to affected operators. However, we believe that more detailed information concerning the circumstances which brought about our investigation and recommendations should have been included in the alert and disseminated to the operators. Without such knowledge, the importance of following the service instruction and your interim suggested operating limitation and the need for application of appropriate piloting techniques are likely to be missed by these operators.

On June 19, 1970, we conducted additional tests and examinations of Cessna electrically-driven flap actuators recovered from the wreckage of accidents in which inadvertent flap retraction could have led to loss of control at a critical altitude. Also tested were two flap actuators from aircraft involved in pilot-reported unwanted sudden flap retraction. The tests were conducted at the Cessna plant at Wichita, with the invited participation of FAA Central Region personnel. While the suspected mechanism of failure - based upon previous Cessna Company experience - could not be reproduced in the laboratory, the corrective or preventive action prescribed by Cessna appears to be suitable if this preventive maintenance is to be made mandatory at reasonable inspection intervals and if effective inspection/detection techniques are prescribed.

We conclude that the Cessna Company's finding that "shellacking" or glazing of the jackscrew drive induces slippage is a valid one. Preventive maintenance, however, does not completely preclude the

recurrence for an unlimited time, nor does it resolve the precise mechanism of failure, i.e., the time-environment-material factors that cause the "shellacking" buildup, and therefore permit hazard elimination techniques to be applied. Until this precise mechanism can be determined, any time interval for preventive maintenance, in our opinion, will be arbitrary.

Further, we are not satisfied that the inadvertent retraction of flaps due to jackscrew drive slippage is exclusively the major causal area. Unwanted flap retraction could well be operational, or system design/operator induced. It is in this latter area that we believe certain assurances need to be made that possible hazardous control inputs by inexperienced pilots are not allowed in the approach and go-around regimes of flight. It is for this reason that we felt, and so recommended, that all operators should be apprised of the circumstances under which inadvertent flap retraction - mechanical or pilot induced - can cause loss of altitude with insufficient altitude for recovery.

We understand that your Administration is now contemplating the issuance of an Airworthiness Directive to require preventive maintenance to preclude flap actuator failure. We are inclined to believe that timely cleaning and lubrication of these flap actuators will tend to preclude the mechanical failure, but such an AD will not treat the operational aspects of the overall problem.

We therefore reiterate the continued need for operators to be emphatically and fully informed of the hazards associated with either improper or inadvertent flap retraction at low altitude. Dissemination of hazard information and appropriate operational techniques to cope with inadvertent flap retraction should be expedited to all operators and owners.

Our test findings at Wichita have been coordinated with your Central Region personnel, and we appreciate the action already taken in response to our recommendation.

Sincerely yours,

John H. Reed

John H. Reed
Chairman